



PII: S0160-7383(97)00037-6

POLITICAL ECOLOGY OF TOURISM

Susan C. Stonich

University of California, USA

Abstract: This article uses a political ecology approach to examine the relationships among tourism development, water, and environmental health in the Bay Islands, Honduras. It identifies the various stakeholders involved in the tourism industry, their relative power with respect to control of water resources, and distributional outcomes related to water quality and environmental health. Integrating the findings of ethnographic, survey, and environmental research conducted since 1991 in three communities, it shows that while the Islands' freshwater, land, and marine resources are jeopardized by unchecked tourism development, adverse affects are not distributed equally among various stakeholders. Reinforcing earlier findings focused on socioeconomic and nutritional outcomes, it concludes that while significant environmental degradation is attributable to the actions of powerful national and international stakeholders, it is the Islands' impoverished ladino immigrants and poor Afro-Antillean residents who are the most vulnerable to environmental health risks emanating from those activities. **Keywords:** political ecology, water, environmental health, Bay Islands, Honduras. © 1998 Elsevier Science Ltd. All rights reserved.

Résumé: L'écologie politique du tourisme. Cet article utilise une approche d'écologie politique pour examiner la relation entre le développement touristique, l'eau et la santé écologique des îles du golfe du Honduras. On identifie les intéressés de l'industrie touristique, leur pouvoir relatif pour contrôler les ressources d'eau, et les résultats de distribution pour la qualité de l'eau et la santé écologique. On conclut que les ressources de terre, d'eau fraîche et de mer sont compromises par le développement non maîtrisé du tourisme et que la dégradation écologique signifiante se doit aux actions des intéressés puissants. Les immigrants métis pauvres et les habitants afro-antillais pauvres sont les plus vulnérables aux risques écologiques de la santé qui proviennent de ces activités. **Mots-clés:** écologie politique, eau, santé écologique, îles du golfe du Honduras. © 1998 Elsevier Science Ltd. All rights reserved.

INTRODUCTION

Central American governments are exploring new avenues of economic development designed to integrate and diversify their economies, promote foreign investment, and increase foreign exchange earnings (Stonich 1993). One of the most important of these development strategies is the promotion of international tourism which has grown significantly since the late 80s in tandem with increased political stability in the region (CAN 1996; LADB 1996). Between 1987 and 1991, tourist arrivals and receipts to Central America grew at average annual rates of 11.5% and 16.8%, respectively exceeding the average rates of tourism growth globally, in the Third World, and elsewhere in the Americas during the same period (Stonich, Sorensen and Hundt 1995). In 1991, 2.1 million international tourists visited Central America, surpassing the previous high of 1.7 million tourists reached in

Susan Stonich is Associate Professor of Anthropology and Environmental Studies at the University of California, Santa Barbara (CA 93106, USA. Email stonich@ssc.ucsb.edu). Her current research interests focus on the human and environmental consequences of economic development in coastal zones of the Caribbean Basin.

1975 before the outbreak of widespread regional violence. At that time, international tourism receipts to Central America constituted 22% of total export earnings, approaching the percentage contribution of tourism revenues to the tourism-dependent economies of the Caribbean (24.3%) (Stonich, Sorensen and Hundt 1995).

By 1996, more than 2.5 million tourists visited Central America annually and tourism contributed approximately \$1.5 billion to foreign exchange earnings (CAN 1996; LADB 1996). International development donors, especially the World Bank, the Inter-American Development Bank (IDB), the United Nations (UN), and the United States Agency for International Development (USAID) have played key roles in the expansion. Financial assistance from these institutions has helped fund a number of international and national tourism initiatives in the region. These include: collaborative efforts among international donors, non-governmental organizations (NGOs), national governments (primarily Central American, Mexican, United States, and European), and private investors; a more important position for tourism in international trade policy; and economic incentives for potential international and national investors (Stonich, Sorensen and Hundt 1995). In May 1996, Central American presidents signed the "*Declaration of Montelimar II*", which gave priority to the tourism industry as the paramount economic growth strategy within the isthmus and emphasized the promotion of the Central American region as a single tourism location rather than as several separate national destinations (CAN 1996; LADB 1996). The designation of tourism as a dominant economic development strategy raises critical concerns, given the devastating social, economic, and environmental consequences of many previous development schemes in the region, such as the promotion of cotton and beef cattle (Conroy, Murray and Rosset 1996; Murray 1994; Stonich 1993; Williams 1986).

Tourism has been recommended as a viable means of economic development for Honduras for several decades (Checchi 1959:90-99; Ritchie et al 1965). It was only in the early 80s, however, that the government of Honduras (GOH) aggressively began promoting tourism as a national development strategy—emphasizing the important Mayan archeological site of Copan, the scenic beaches and colonial history of the North Coast, and the relatively pristine coral reefs of the Bay Islands. Since 1980, the GOH has promulgated a series of laws that established a number of specified "tourism zones" and provided generous tax and import incentives to attract foreign capital investment. As part of its augmented embrace of neo-liberal economic policies and associated emphasis on the promotion of so-called "non-traditional" exports, these measures have accelerated since 1990, especially with the establishment of tourism-free zones (1992 Decreto Numero 84-92) which gave investors in the tourism industry the same fiscal benefits as the private export processing zones. These incentives include: 100% foreign ownership; the right to operate without paying federal and municipal taxes; the right to import free of all duties and taxes any equipment needed to build, furnish, supply, and run a business (including motor vehicles, boats, yachts, and airplanes); and the right to replace old and worn equipment tax-free. Potential foreign

investors also have access to para-statal organizations such as the Foundation for Investment and Development of Exports (FIDE), which assists foreign companies seeking to develop investment and sourcing programs in Honduras. With access to advanced information technologies (i.e., its recently created World Wide Web homepage <http://www.hondurasinfo.hn> and Email address fide@hondutel.hn) FIDE advertises itself globally as "Your One-Stop Office of Investment" (FIDE 1997). In an attempt to integrate investment and tourism efforts, the Industrial Development Group—Honduras (a division of FIDE) and the Honduran Institute of Tourism recently opened a joint office in Miami.

The effects of tourism on water are a major concern for a number of reasons. Water not only is necessary to sustain life and livelihoods, but also is a central attraction and a vehicle for a number of primary tourist activities such as swimming, diving, snorkeling, and fishing. Furthermore, a safe and dependable supply of water is highly related to the health of tourists and residents alike. Tourism development may affect the water supply both quantitatively (i.e., by reducing the total availability of freshwater) and qualitatively (i.e., by increasing the degree of contamination and pollution of fresh and marine sources). In addition, tourism is an important user of the world's increasingly scarce water resources and often has to compete with alternative uses of water, especially in places where freshwater tends to be sparse, such as on small islands located in tropical and sub-tropical areas (Miller and Auyong 1991). In such areas, the local populations and the tourism industry often compete for scarce supplies, most intensively during the dry season which usually coincides with the tourism season. Several studies have shown that on a per capita basis, the demands of tourism significantly surpass domestic and municipal demands (Gajraj 1981; Grenon and Batisse 1989:156; Lvovich and White 1990). According to Gajraj (1981), the per capita consumption of freshwater by tourists in Barbados is 6–10 times more than that of the local population. Freshwater shortages may also occur where freshwater is withdrawn from local aquifers to supply tourists. In some coastal regions pumping groundwater for beach resorts has led both to a lowering of the groundwater tables and destruction of coastal wetlands and to the replacement of freshwater by saltwater (Oglethorpe 1982).

Tourism may also affect water quality. Unregulated and uncontrolled tourism can cause water pollution at the local level, thus jeopardizing a critical resource whose high quality is absolutely essential for the survival of the tourism industry. One of the most threatening concerns is pathogen contamination caused by improper disposal of human waste. Several studies have examined the linkages among tourism development, water quality, and human health (Archer 1985; Hunter and Green 1995:10–51; Kocasoy 1989, 1995; UNEP 1984). These studies point out the common practice of disposing of human sewerage into fresh and marine waters, thus providing an ideal medium for infectious diseases caused by bacteria, viruses, protozoa, and metazoa. Among these diseases, gastrointestinal infections caused by ingestion are the most common.

Research also has found correlations between the level of fecal pollution of bathing water measured by the concentration of bacterial indicators and the gastrointestinal diseases of swimmers. Investigations also determined that although the number of pathogenic bacteria and viruses generated from people bathing in the sea is limited, these pathogens may penetrate the respiratory system and cause eye, ear, skin, and upper respiratory infections which at times are more common than gastrointestinal infections (Kocasoy 1989). The most common indicators of pathogens in water are total coliforms and fecal coliforms. If coliform contamination exceeds certain levels, the water is regarded as unfit for drinking and/or swimming. In tourism settings, high fecal counts are associated with the lack of (or malfunctioning) sewerage and septic systems. To combat water contamination by pathogens, most studies conclude that it is essential to provide sewerage treatment facilities in tourism areas. Unfortunately, even in wealthier countries, the rates of effective treatment are low. For example, along the Mediterranean coast of France <50% of human sewerage is effectively treated (Grenon and Batisse 1989:157).

Declining water quality in tourism areas can also be caused by a number of other factors including: destruction of habitats stemming from tourism-related infrastructure (e.g., road building and hotel construction), deforestation, and erosion that lead to increased sediment loads; the indiscriminate use of fertilizers and pesticides to maintain golf courses, lawns, and gardens; tourist transportation (cruiseships, motor boats, and other vehicles) that pollute water not only with hydrocarbons but also with human waste and detergents; and the behaviors of individual tourists who throw bottles, cans, and other garbage into water bodies. The economic consequences of declines in water quality are obvious: tourists stop frequenting areas that become known for these problems. This is illustrated by the recent decline of the western Mediterranean as a prime destination and the simultaneous increase in tourism in the less-polluted eastern Mediterranean, Caribbean, West Africa, Kenya, the Seychelles, Mauritius, and elsewhere (Mieczkowski 1995:210).

POLITICAL ECOLOGY OF TOURISM DEVELOPMENT

Political ecology has emerged as a diverse, interdisciplinary approach for analyzing human-environmental interactions, especially those associated with economic development in the Third World (Bryant 1992; Peet and Watts 1993). The eminent anthropologist, Eric Wolf, was among the first to use the term "political ecology" in a critique of ecological anthropology and cultural ecology in which he pointed out the theoretical need to integrate local ecological contexts within the broader political economy (Wolf 1972). Most often, political ecology attempts to understand how environmental and political forces interact to affect social and environmental changes through the actions of various social actors at different scales (levels of analysis) (Bryant 1992). Utilized by anthropologists, geographers, political scientists, and historians, among others, the recent expansion of the

subject is closely associated with the influence of Blaikie (1985) and Blaikie and Brookfield (1987), for whom political ecology combines a broadly-defined political economy with the concerns of ecology.

In general, political ecological analysis consists of an integrated explanation of human–environmental interactions linked through different scales from the international/global to the local (Blaikie and Brookfield 1987); centers on the relative power of various social actors (stakeholders) involving access to, and management of, natural resources; and links these actors within and among levels through relations of power (Peet and Watts 1993; Stonich 1993). Essential elements of political ecological analysis encompass the *ideologies* that direct resource use and influence which social actors benefit and which are disadvantaged; *international interests* such as donor agencies or private investors that promote particular patterns of natural resource use; the function of the *global economy* in promoting particular patterns of resource use; the *role of the state* in determining and implementing policies that favor the interests of certain social actors over those of others; the relationship of *class and ethnic structures* to conflicts over access to productive resources; the interrelations among *local resource users* and groups of society who affect resource use; and *diversity* in the decisions of local resource managers (Stonich 1993). In some conceptualizations (Peluso 1993), political ecological analysis also is diachronic (integrating the role of history in explaining contemporary patterns and processes) and includes gender as a criterion to classify relevant social categories (Guha 1990). Because political economy requires the analysis of forces that are external to local groups and influence options and decisions at the local level, substantial study is given to the ways in which international forces and the state affect the actions of local people on the environment, on the local ecology, and on other human actors.

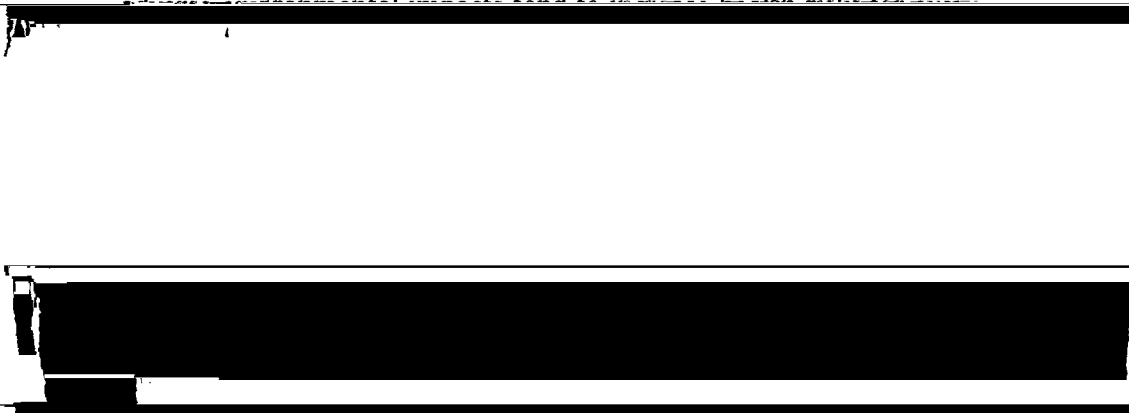
One major thrust of research using a political ecology approach has emphasized human impoverishment and environmental destruction stemming from dominant development models operating in collaboration with the state (Faber 1992; Little and Horowitz 1987; Painter and Durham 1995; Stonich 1989). These studies have identified several issues which potentially can help understand deteriorating human and environmental conditions in other development contexts, including tourism development. First, environmental destruction identified with the economic production systems of the poor usually is an outcome of their impoverishment, either absolutely or relatively to other social classes. Impoverishment often is related to diminished access to land and other natural resources and to increased repression and violence at the hands of state authorities and more powerful individual and corporate interests engaged in land speculation. Second, as a consequence of their vulnerability and lack of power, smallholder producers often have received a disproportionate share of the blame for environmental decline (Stonich 1989). In contrast, political ecological research has demonstrated that a great deal of land and other natural resources have been degraded by the activities of more powerful private, public, and corporate interests (Stonich 1989, 1993). Large-scale enterprises that have acted

destructively frequently have been granted land on concessionary terms by the state. This allows these more powerful stakeholders to treat land as a low-cost input, and makes it more economical to move elsewhere after the environment is degraded rather than try to conserve natural resources. Third, the same policies and practices that result in wealthy interests receiving land on favorable terms are responsible for the impoverishment of smallholders, because such policies institutionalize and exacerbate unequal access to resources. In sum, the political ecology approach applied to Third World development has shown that the crucial issue underlying environmental destruction and human poverty is blatant inequality in access to resources within a socially institutionalized context (Painter and Durham 1995; Stonich 1993).

Political ecological analysis provides the means to conceptually and methodologically integrate several areas of tourism research, political economy, environmental quality (including water quality), and human environmental health. Although studies of tourism from an explicitly political ecological perspective are few, political economic analysis of international tourism has been a major approach (Britton 1982, 1987, 1989; Brohman 1996; Enloe 1989; Lanfant and Graburn 1992; Pleumarom 1994). These studies point out a number of important characteristics associated with the expansion of tourism in the Third World that are central elements of political ecological analysis as well. These include: the major part played by development assistance from multilateral and bilateral donors such as the World Bank, the United Nations, and regional development banks in promoting tourism development (Brohman 1996; Lanfant and Graburn 1992; Pleumarom 1994); the interconnections among excessive foreign ownership, vertically integrated transnational tourism corporations, and foreign exchange leakages (Britton 1987; Brohman 1996); the importance of Third World states in promoting tourism development as a means to improve and diversify economies through increased foreign exchange and investments (Britton 1982, 1987; Brohman 1996); the linkages among various social actors (stakeholders) at various levels of analysis (scales) (Britton 1987; Brohman 1996); the relative costs and benefits of tourism development along with the creation and/or exacerbation of existing social and spatial inequities (Brohman 1996; de Kadt 1992; Smith and Eadington 1992; Tsartas 1992); and growing social conflicts between stakeholders over control of local resources (Britton 1987; Brohman 1996; Dieke 1993; Oliver-Smith 1989; Poirier and Wright 1993).

Over the last two decades, a burgeoning number of studies have dealt with the impacts of tourism development on environmental quality, including effects related to diminished biodiversity, erosion, pollution, and degradation of water and other natural resources (Cohen 1978; Edwards 1988; Green and Hunter 1992; Hunter and Green 1995; IRF 1996; Lindberg 1991; Mathieson and Wall 1982:93–132; Mieczkowski 1995; Miller and Auyong 1991; Nelson, Butler and Wall 1993; Patullo 1996; Pearce 1989:229–243; Pigram 1980; UNEP 1984, 1995; Wilkinson 1989; Wong 1993). As discussed above, a smaller number of studies have centered specifically on the linkages

among tourism development, water quality, and human health—especially in coastal zones. While these studies demonstrate that



one to some extent, political ecological analysis allows the disaggregation of these consequences by various social actors (stakeholders).

Research Methods

The research results presented in this article are from an ongoing, collaborative study of the related human (social, economic, nutritional, and health) and environmental effects of tourism development in the Bay Islands, Honduras. Initially, the project had to confront the very limited availability of existing data on all factors of interest, including the lack of any baseline data at the community level. The lack of information on conditions that existed before the recent boom in the tourism industry has made it extremely difficult to make causal connections between tourism development and the current situation. In addition, tourism development has not been the only force of change on the Islands: for example, the decline in the Islands' fishing industry, the expansion of pasture, and demographic changes stemming from the migration of ladinos from the mainland also have been important factors. However, the direct associations between tourism-related development and environmental and social changes are strong enough to suggest that the growth of tourism has had some grave impacts.

To date, the overall project has used a political ecology approach to analyze human–environmental interactions in three neighboring communities—Sandy Bay, West End, and Flowers Bay—located on the western end of Roatan (Figure 1). These communities, discussed

elsewhere (Stonich, Sorensen and Hundt 1995), were chosen for a number of reasons. First, at the time research began in 1991, that section of Roatan was a "hot spot" where tourism was growing explosively. Thus, the findings from these communities could be used to predict subsequent repercussions on other parts of the Islands and elsewhere. Second, although tourism was growing rapidly, it appeared to be affecting communities quite differently (e.g., in terms of the degree and style of tourism). During the first year of the project, rapid assessment techniques (i.e., interviews with individual and focus groups; compilation of documentary, statistical, and technical reports; and field reconnaissance) were used to acquire initial information about the characteristics of the tourism industry as it was developing on Roatan. A small pilot study was carried out in order to test household-level survey instruments that were modifications of household surveys previously administered to men and women householders on the Honduran mainland.

The second year of the project, 1992, field research emphasized the collection of baseline data through in-depth ethnographic and survey research in the three communities. Because national census data appeared inaccurate and out-of-date, research in each community began with preparing a base map and community census which served as sampling frames from which a 50% random sample of households was chosen for survey work. The preliminary community census also enabled researchers to determine more accurately the population of each community and to identify specific Spanish- and English-speaking households. Appropriate Spanish or English versions of the semi-structured surveys were administered separately to women and men heads of households. Both the women's and men's surveys contained questions regarding attitudes toward tourism development. In addition, the surveys administered to men householders included questions regarding the economic options available to men and their use of land, marine, and other natural resources. The women's surveys included a more detailed household census, a reproductive history, a material culture inventory of household goods, questions related to the economic activities (including domestic tasks) of women, family dietary patterns and nutritional problems, and a family health history. A specific section of the instrument included questions related to access, use, and treatment of water resources. A total of 249 interviews were administered. These interviews were essential not only for the collection of baseline data but also to help identify individuals for life history interviews. These were people who were especially well-informed about their communities and the recent history of the Bay Islands. Audio-tape recorded oral histories were elicited from six individuals (two in each community) in order to document their perspectives on changes in the Bay Islands, thereby contributing to a longitudinal understanding of the impacts of development. Two additional types of semistructured survey instruments were administered the first and subsequent years of the project: a tourist survey administered to approximately 200 tourists per year and a business survey that documented the annual growth of tourism-related businesses in the three communities.

In 1993 the project expanded to include a more specific nutritional study carried out in association with a second household survey that was administered to 225 householders. This was an abridged version of the survey administered the previous year. In collaboration with St. Luke's Medical Mission and other local healthcare providers, anthropometric data from 189 children 5 years old and younger were collected in the study communities. A parent was also interviewed about dietary habits of each child. These data were linked to specific households via the household surveys.

Most recently, in 1994, the project expanded to include a water quality and environmental health component. A critical addition was the investigation of the quality and quantity of potable water and of seawater quality near sites of human habitation. Although several water quality tests had been done previously, these had concentrated on seawater near prime dives sites and major resorts, in order to determine potential risks for tourists, rather than on potable water available to Island residents and tourists alike or on seawater adjacent to local communities. With the assistance of Becky Myton (Professor of Biology at the National Autonomous University of Honduras and technical advisor to the recently created Honduran Ministry of Tourism), a simple, but reliable, methodology and system for determining total coliform and fecal coliform (*Escherichia coli* or *E. coli*) contamination of potable water and seawater was set up at project headquarters [for the water testing methods used see HACH (1993)]. More than 200 water samples from all available sources of potable water (community wells, private wells, rainwater cisterns, natural springs or seeps) and at selected points throughout the communities' water lines were collected and analyzed. Samples of "purified" bottled water were also analyzed. In addition, samples of seawater from shoreline sites adjacent to human settlements and beach areas were also collected and analyzed. Drinking water from all sources available in the three communities were tested for the presence and absence of total coliforms and *E. coli* on the theory that any presence of these bacteria was unacceptable (WHO 1993). Sufficient sampling of seawater was done to calculate the density of these bacteria using the method of "most probable number" (HACH 1993).

As assessment of human environmental health related to water quality was made based on analysis of diagnoses included in the more than 2,000 computerized patient records from the Island's only no-fee, non-governmental, primary care clinic, St. Luke's Medical Mission, located in Sandy Bay. Analysis focused on determining the extent to which fecal-oral water-borne infections (e.g., diarrheas, dysenteries, and enteric fevers), water-washed skin and eye infections, and water-related insect vector diseases (e.g., malaria and dengue fever) were affecting the local and tourist populations.

Tourism Development in the Bay Islands

The Bay Islands are located about 50 km off the coast of northern Honduras and now are easily accessible from the mainland by plane,

boat, and ferry, as well as by direct international flights from the United States, El Salvador, and Belize. They are made up of 8 islands and 65 cays, having a total land area of approximately 238 km². The largest of the islands is Roatan which covers 127 km² and is the site of most tourism development. A mountainous ridge bisects the length of the island from northeast to southwest and steep hillsides end abruptly at the coastline. While Roatan boasts only a few palm-fringed, white sand beaches (most notably West Bay Beach, Alligator Nose Beach, and Camp Bay), they are spectacularly beautiful and provide ideal sites for swimming, snorkeling, and sunbathing which are the major pastimes of domestic visitors and many international tourists. The Islands' main international attraction, however, is the fringing coral reef which scuba devotees regard in the same class as the Great Barrier Reef of Australia. The reef performs important ecological functions, including providing critical habitats for numerous marine species and shielding the shorelines from inundation (Vega, Alevizon, Dodd, Botaños, Villeda, Cerrato and Castro 1993). Although rainfall averages at least 2,000 mm per year on all of the Bay Islands, most precipitation occurs during the short rainy season, especially during October and November. The primary tourism season is during the dry season from January through June during which <100 mm of precipitation falls.

In addition to enchanting tropical beaches and spectacular coral reefs, reminders of the Islands' rousing history are evident in remnants of prehistoric archeological sites, pirate strongholds, English fortresses, underwater shipwrecks, and an ethnically diverse population (English/Creole speaking Afro-Antilleans, Anglo-Antilleans, and North Americans; Garifuna or Black Caribs; and ladinos). Together these attractions make the Bay Islands suitable for the principal types of Central American tourism development: sun, sea, and sand tourism; adventure and ecotourism; and cultural heritage tourism (Stonich, Sorensen and Hundt 1995). Their important potential for tourism development have made the Bay Islands a focal point of federal legislation since they were declared a tourism zone in 1982 (*Acuerdo Numero 87*). Particularly significant are the 1991 *Acuerdo Ministerial Numero Dos* which established the minimum standards for any Bay Islands' development, including restrictions on coastal building and protective measures for mangroves and offshore coral and marine life, and the 1993 *Decreto 83-93* which created a Bay Islands Commission to promote development, review all development plans, and preserve the Islands' environment.

The GOH's recent efforts to promote tourism in the Bay Islands required that it face several hundred years of Anglo-Hispanic conflict during which time control of the Islands alternated between British and Spanish/Honduran political powers (Davidson 1974). Even after Honduras eventually gained sovereignty over the Islands through the Wykes-Cruz Treaty of 1859, the overwhelmingly dominant Anglo-Antillean and Afro-Antillean population successfully isolated itself from Honduran control. To a great extent, Islanders retained their ethnic, cultural, linguistic (English/Creole), and religious (Protestant) heritage; maintained their social, cultural, and economic ties to the

other English-speaking enclaves in the Caribbean, especially to Belize and to the Cayman Islands (Parsons 1954); and intensified their links with the United States (Davidson 1974). Today, many Islanders refer to themselves as "British" rather than "Honduran" and convey sentiments of political independence from Honduras and allegiance to the United States. The recent boom in tourism is linking the Bay Islands into the mainland polity, economy, society, and culture as never before. Not surprisingly, enhanced integration has been accompanied by heightened friction between longtime resident Anglo-Caribbean/Afro-Caribbean Islanders and recently arrived Spanish-speaking ladinos from the mainland (e.g., government agents/officials, the army/police, national elites, and poor immigrants).

Until recently, their relatively low population density, comparative isolation, and poor communication infrastructure, protected the Bay Islands from many of the adverse social and environmental costs of tourism that have characterized much of the eastern Caribbean. Beginning in the 60s, a small tourism industry made up mostly of divers and recreational sailors began to enjoy the splendid reef, clear waters, secluded harbors, and tranquil beaches. At the same time, according to most social, economic, education, and health measures, the Bay Islanders managed to maintain a quality of life that significantly surpassed that of Honduran ladinos on the mainland (Stonich, Sorensen and Hundt 1995). Unfortunately, these conditions began changing radically in the 80s, in the context of the largely unregulated and uncontrolled growth of tourism. In 1990 an estimated 15,000 tourists visited the Bay Islands, making these the most popular tourism destination in Honduras. By 1993, the number of international arrivals grew to 30,000—more than the entire local population which was then estimated to be about 23,850 (BID 1994:3). In 1994, the number of tourists climbed to 40,000, of which about 80% were from the United States. Estimates suggest that the number of tourists to Roatan alone could reach 78,000 per year in the future (Vega et al 1993:18).

Expansion of the industry also stimulated the migration of thousands of desperately poor ladinos from the mainland seeking a better life through employment in the tourism sector. In addition to tourists and ladino mainlanders, the Islands' population currently is being augmented by a growing number of foreigners. Until recently, tourism on the Islands was dominated by Bay Island and other Honduran interests. More recently, however, these initial promoters have been joined by a number of foreign real estate developers and other well-capitalized investors whose aims include converting previously undeveloped portions of coastal and upland areas into large scale resorts and upscale housing subdivisions. Their efforts have provoked widespread land speculation, an upward spiral in land prices, and intensified social conflicts over land and access and use of the Islands' limited freshwater and marine resources. Although a small number of expatriates and retirees from the United States, Great Britain, and elsewhere have started businesses and/or made the Islands their permanent or vacation home for several decades, the recent arrival of large-scale foreign developers has exacerbated conflicts markedly.

The internationalization of the Islands' tourism industry was advanced recently by the announcement of plans by Holiday Inn to build five new luxury resort hotels in Honduras, including one on Roatan (La Prensa 1997).

Population Growth in the Bay Islands. Between 1974 and 1988, the population of the Bay Islands grew by about 110%, surpassing the rise in the national population (65%) during the same time period. Since 1988, the annual population growth rate of the Islands is estimated to be >5.5%, well above the 3% annual population growth rate in Honduras. According to data from various national censuses of population, the percentage of ladinos on the Bay Islands grew from 7% in 1970, to 12% in 1981, before reaching 16% by 1988. However, community-level population censuses conducted as part of this study reveal a much higher percentage of ladino residents, approaching 50% in some communities (Stonich, Sorensen and Hundt 1995).

Tourist Intensity Ratio (TIR), the percentage of tourists to the resident population, and the Tourist Density Ratio (TDR), the ratio of tourists to land area, frequently are used to indirectly measure and compare the potential relative impacts of tourists at the national level. As shown in Table 1, in 1991 in the Caribbean Basin, the TIR was greatest in Belize (111.5%), followed by the Insular Caribbean (98.3%). On the basis of TIRs, impacts were much lower elsewhere, with Honduras having one of the lowest ratios in the region (3.7%). In terms of the TDR, the highest ratios were found in the Insular

Table 1. Tourist Impacts in the Caribbean Basin (1991)

	Population (millions)	Tourists (1,000)	Area (1,000 km ²)	TIR ^a (%)	TDR ^b (tourists/km ²)
Insular Caribbean ^c	16.5	16 257	n.a.	98.3	n.a.
Mainland:					
North America/Mexico	83.3	16,560	1,958	19.9	8.5
Central America:					
Belize	0.2	223	23	111.5	9.7
Costa Rica	3.1	505	51	16.3	9.9
Panama	2.5	279	77	11.2	3.6
Guatemala	9.5	513	109	5.5	3.6
Honduras	5.3	198	112	3.7	1.8
El Salvador	5.3	199	21	3.8	9.5
Nicaragua	3.8	146	130	3.8	1.12
South America:					
Colombia	32.8	857	1,139	2.6	0.75
Venezuela	19.8	598	912	3.0	0.66

^aTIR=(number of international tourist arrivals/total population) × 100.

^bTDR=number of international tourist arrivals/area in km².

^cInsular Caribbean includes St. Maarten, Cayman Islands, British Virgin Islands, US Virgin Islands, Bahamas, Aruba, Turks and Caicos Islands, Antigua and Barbuda, Bonaire, Anguilla, Barbados, St Kitts and Nevis, Montserrat, Curacao, Martinique, Grenada, St. Lucia, Puerto Rico, St. Vincent, Guadeloupe, Dominica, Jamaica, Dominican Republic, Trinidad and Tobago. Analysis does not include Cuba and Haiti.

Source: World Bank (1993) and WTO (1993).

Table 2. Tourist Impacts in The Bay Islands (1974-94)

	1974	1988 ^a	1992	1994
Population	13,194	21,553	23,850	26,300
Tourists	1,000	15,000	30,000	40,000
Area (km ²)	238	238	238	238
TIR ^a (%)	7.6	69.5	125.8	152.1
TDR ^b (tourists/km ²)		63	128	168

^aThis is a very significant year in the Bay Islands tourism industry because it was in 1988 that the airport facilities were improved to allow international jet landings.

Source: Calculated from data in SECPLAN (1989), Sorensen (1993), and Stonich, Sorensen and Hundt (1995).

Caribbean, Belize, and Costa Rica, all with TDRs > 10 tourists/km². In contrast, Honduras had one of the lowest TDRs in the region, 1.8 tourists/km². On the basis of these aggregate national level data, it appears that tourists may have relatively little impact in Honduras. However, when the Honduran data are spatially disaggregated, a very different picture emerges (Table 2). The Bay Islands comprise only 0.2% of the land area in Honduras, yet in 1991 were the site of > 10% of foreign visitors to Honduras. Between 1974 and 1994, the TIR rose from 7.6% to 152.1%, and the TDR increased from 4 to 168 tourists/km², with most of the increase occurring after 1988, the year that the jet runway was completed on Roatan opening up the Islands to direct international flights. In the 90s, values of TIR for the Bay Islands were comparable to those for the Insular Caribbean and surpassed those for many other major international destinations such as Barbados and Jamaica; for comparisons with other locations see Harrison (1992:11-13). While tourists may have little impact on the country overall, they have exceptionally high impacts on the Bay Islands, exceeding the average impact in the tourism-dependent Insular Caribbean. Moreover, between 1988 and 1994, the total number of tourists to the Islands increased by 167%. This was significantly higher than the percentage increase in the number of Island residents (including ladino immigrants), which was 21% during the same period.

By the mid-90s, the combined effects of the escalating number of international tourists and ladino immigrants elevated the population to a level at which the Islands' freshwater supply, as well as food and other natural resources, were threatened, and many local communities' abilities to maintain human health services and other vital services were overwhelmed. In the words of a 30-year resident of the Islands originally from the United States,

Roatan, which used to be one of the most beautiful, unspoiled, pristine islands in the entire Caribbean... is going down the tubes and it might be too late even now, to save it... Too many people in too small a space is a recipe for big trouble, and Roatan has big trouble... The need for building sites, roads, and firewood has resulted in most of the trees being cut down. The loss of trees and other groundcover has destroyed the potable water aquifer. The watertable has dropped like a rock. Wells that used to provide an abundance of freshwater for 10,000 people are now (faced with the

demands of two or three times that number) either dry or contaminated by surface or subsurface infusion... Smart people buy their drinking water in plastic bottles.

These concerns raise the important question of whether it is population growth *per se* that is the root cause of the environmental degradation occurring on the Islands. An essentially demographic explanation, however, is an oversimplification of reality since the majority of population growth is from tourists and ladino immigrants and is directly associated with the expansion of the tourism industry. Part of this expansion has included significant infrastructural development in certain domains (especially airport improvement and road construction) and a simultaneous lack of infrastructural development in other critical domains (especially water, sewerage, and solid waste disposal systems). While it is clear that escalating numbers of tourists and immigrants put more pressure on the Islands' environment and natural resources, the major intent of development efforts has been to increase the number of tourist arrivals, regardless of the environmental and human costs. A more fundamental basis of environmental degradation in the Bay Islands is the rapid, largely uncontrolled expansion of the tourism industry.

Tourism and the Local Community. The socioeconomic and nutritional repercussions of the tourism industry on the people and communities of Sandy Bay, West End, and Flowers Bay have been reported previously (Stonich, Sorensen and Hundt 1995; Stonich and Sorensen 1995). In short, the consequences of tourism have included increased social differentiation and a growing gap between rich and poor; the assignment of the majority of ladinos and Islanders to low status, low paid, temporary jobs; reduced access for local people to the natural resources on which they depend for their livelihoods; escalating prices for food, manufactured goods, and housing; land speculation and spiraling land costs; increased outside ownership of local resources; and deterioration of the biophysical environment. According to measures of economic production, income, wealth, consumption, and nutrition, Afro-Caribbean Islanders range in wealth from very rich to very poor. But ladinos on average tend to be significantly poorer and at higher nutritional risk than Islanders. The most telling result of the anthropometric studies of children <60 months of age was that undernutrition was found only among ladino children, albeit at rates lower than on the mainland (Stonich and Sorensen 1995). Many recent ladino immigrants express disappointment about their lives on the Islands as did a 31-year-old mother of four who said,

We came here because we had no land and there was no work in Belfate [on the mainland]...but there's not enough work here either...no good work...we make [earn] more here when we find work but things cost twice as much.

For poor ladino and Islander families, inadequate benefits from employment in the tourism sector have combined with reduced access to what had been publicly available fishing, hunting, and gathering

resources (e.g., through the establishment of the Sandy Bay Marine Reserve). In the words of a 35-year-old ladino immigrant,

I do plantation work (i.e., yard work), my wife works as a maid at Palm View Cabins, and my kids sell fish when they can catch them. It's hard and sometimes only the little ones eat. Sometimes at night I go out and fish on the reef or hunt iguana in the hills. They tell us not to [take fish and shellfish from the reef or hunt iguana] but my kids have to eat.

Many poorer Island residents (Islanders and ladinos) are indignant about being urged to end or reduce their fishing and hunting activities by wealthier inhabitants. Less powerful residents are well aware that it is these more influential stakeholders who are the owners of commercial fishing fleets, hotels, resorts, and other businesses, who are responsible for over-fishing shrimp and lobster, and who are engaged in a real estate and hotel building spree (despite the existing shortage of freshwater and the absence of sewerage and other solid waste disposal systems), unsound road building, mangrove destruction, extensive dredging of the reef, and other environmentally destructive activities. Many poor local people feel that their own temperance will be of no benefit unless everyone can be made to restrict his or her fishing effort or other environmentally destructive activity. "I'll stop hunting iguanas when they [Island elite and foreign investors] stop dredging for new marinas and hotels and over-fishing", said a 72-year-old Afro-Caribbean Islander whose family had lived on the Islands for several generations. The gap in wealth between resort owners, whose guests make the most use of the reef, and local subsistence users, only strengthens the stance of poorer residents who feel they should not bear the burden of environmental conservation. It is not surprising that the one marine reserve (the Sandy Bay, West End Marine Reserve, established in Sandy Bay in 1989 and expanded to include West End and the West Beach area in 1993) is having difficulty restricting use despite the fact that it is part of the municipal protected area system.

Less powerful stakeholders, including most poor and middle-class Islander and ladino residents, also feel estranged from the goals and activities of the best known environmental conservation organization on the Islands—the Bay Islands Conservation Association (BICA). Although BICA works closely with several international development donors and environmental organizations, its emphasis on mainstream conservation efforts (e.g., turtle conservation projects, cosmetic beach clean-ups, and environmental education) have not addressed the environmental, social, cultural, or health concerns of most Island residents. The fact that the families of the two highest officers of BICA are major stakeholders in the tourism industry and significantly benefit financially from the expansion of tourism adds to the skepticism of local people about the motives of the organization.

Survey results show declining support for any further growth of tourism in the communities. In 1993, 76% of all community members and 68% of Islander residents favored the growth of tourism in their communities and throughout the Bay Islands. Just 2 years later, community support declined to 62% of total residents. For native Islanders,

the drop was even greater: to 48%. Feeling victimized by unscrupulous developers and alienated from benefits accruing from the burgeoning tourism industry, local members of the community of Flowers Bay established their own grassroots organization, the Native Bay Islanders Professionals and Laborers Association (NABIPLA) in 1992. NABIPLA has multiple objectives related to increasing the capacity of the Island's poorer residents to participate in the economic development through education, maintaining and improving the environment, and ensuring a safe and reliable supply of potable water (from their point of view and for their benefit). In their words, "NABIPLA agrees with the world's environmental movement but we need to fight the battle from the roots... Our children are the number 1 endangered species. If we instruct our children in the facts of our social problems we will get a better environment" (NABIPLA 1995).

Many of the non-elite residents of West End also have attempted to take control of tourism-related development in their community. Perceiving that the establishment of the neighboring Sandy Bay Marine Reserve, the rise in tourism, and the burgeoning construction of hotels, restaurants, and dive shops were putting increased pressure on their own marine resources, residents of West End lobbied for an extension of the Sandy Bay Reserve to include the area from West End around the southwest tip of the Island to Key Hole on the south shore. It is significant that the initial officers of the West End Marine Reserve were not members of the Island elite and also represented a mix of ladinos, Islanders, and foreign residents.

Environmental Concerns Affecting Fresh and Marine Waters

The Bay Islands' fragile ecosystems in combination with the largely unregulated growth of tourism have resulted in severe environmental problems, most of which affect the Islands' freshwater supply and surrounding seawater. Problems emanate from accelerated deforestation, erosion, and sediment discharge due to site clearing and pasture expansion; the lack of sewerage, solid waste, and treatment facilities; and the absence of hydro-geological studies resulting in the haphazard digging of an escalating number of wells. Consequences include: contamination of fresh and seawater; increased salinity in underground aquifers; a declining supply of potable water; and degradation of coastal zones including mangrove destruction, beach degradation, and coral reef damage (Vega et al 1993).

On Roatan, both non-point and point-specific erosion generate sediment deposits in coastal areas. Serious nonpoint sources of sediments include degraded watersheds in which a variety of erosion processes result in excessive sediments in the streams during the rainy season. More than 70% of the island of Roatan has been cleared recently, most over the last 10–15 years. Deforestation has been caused primarily by the expansion of pasture by wealthier islanders and the spread of hillside agriculture by the increasing number of poor ladino immigrants from the mainlands. Eliminating the forests in the upper part of Roatan's watersheds has altered the natural hydroperiod to the

extent that all but one of Roatan's streams dry up during the dry season, especially during April and May. In addition, wells are affected by the rapid runoff over the denuded lands and diminishing underground aquifers are apparent from the increasing number of dry wells (Vega et al 1993).

A recent environmental report completed for USAID identifies major point-specific sources of sediment discharge all of which are attributable to the actions of powerful public and private stakeholders. They all are related to infrastructure development necessary for tourism, including construction of the road to the airport, the major highway along the length of the Roatan, and the private road leading to West Bay Beach. Clearing for hotel construction also has resulted in serious problems of sediment discharge particularly during the rainy season when heavy rains increase runoff to the beach and destroy areas of corals, mangroves, and seagrass. One of the most serious causes of sediment is the unstabilized, unpaved road from West End to West Bay Beach, the most popular bathing beach on Roatan (Vega et al 1993). The road was constructed by the owner of one of the Island's premier dive resorts who also owns much of the property adjacent to West Bay Beach. The road was built to improve access to this area of tropical forest and premier beach property in order to promote the sale of land and the development of coastal subdivisions. An owner of one of the small hotels on West Bay Beach christened the thick red discharge frequently flowing from the road down the slope through his property and onto reefs and seagrass beds as "Red Clay Creek".

The lowering of the watertable and seawater intrusion that occur as water is extracted from the ground by an increasing number of wells has led to a high salt content in the water supply of many communities. Islanders who can afford to do so now buy commercial bottled water for drinking. Beginning in 1993, water processed and bottled in the North Coast industrial city of San Pedro Sula was transported to the Bay Islands by boat and sold through a local franchise. By 1995, the Islands two largest grocery stores began selling their own bottled water. Diminished access to potable water, increased salinity in the remaining supply, and increased contamination of fresh, brackish, and seawater are among the most significant problems and contentious issues on the Islands and are likely to affect the continued growth and future sustainability of the tourism industry.

Tourism, Water, and Environmental Health

Serious declines in the quality and quantity of potable water are the most critical environmental health risks that have emerged on the Islands and have provoked widespread user conflicts. Groundwater, supplemented seasonally by rainwater, provides the major source of potable water on all the Islands. With increasing frequency, shortages have resulted in rationing and/or an irregular supply both to domestic and commercial users. In addition, no sewerage treatment system exists and an undetermined but large amount of untreated raw sewage

is piped directly into the sea. Even where latrines and septic fields/tanks exist, they frequently leak contaminated water into soil and groundwater. The recent growth of the cattle population in part to meet rising tourism demand, especially on Roatan, further contributes to the contamination of groundwater and it is common to see cattle grazing in fenced pastures close to wells. In response to shortages, anyone who can afford to, digs wells (often several) with little forethought or knowledge of suitable location or depth. To help alleviate resulting problems, the Bay Islands Development Promotion Association (APRODIB), an Island NGO, with funding from international donor agencies has been promoting the building and use of latrines, the creation of hydro-geological maps, and the digging of new (more appropriately located and chlorinated) community wells. To date, however, local municipal agencies seem to be operating with little coordination and success. The lack of an adequate Island-wide solid waste collection and disposal system provides a further source of contamination of the existing water supply as well as prime breeding sites for mosquitos and other pests.

Declining water quality and increasing water scarcity do not affect island residents and tourists equally and certain groups face the associated risks disproportionately. While the project was not able to compare quantitatively water use by tourists with that of local residents, surveys for each group did contain a set of questions related to bathing practices. According to analysis of responses, tourists bathe an average of 3.1 ± 0.6 times/day, most frequently (70%) by showering. Local residents (Islanders and ladinos), on the other hand, bathe only 1.2 ± 1.0 times per day, most often (80%) by taking sponge baths. These results suggest that water use by tourists is substantially greater than that of local residents. Table 3 compares access to the various sources of potable water in rural and urban areas of Honduras and in the three Bay Islands' communities included in the study. It shows

Table 3. Source of Water Supply: Honduras (Urban and Rural) and Communities, Bay Islands (Islanders, Ladinos, and Foreign Residents)

Source of Water (% of households)	Honduras		Bay Islands		
	Urban (1992)	Rural (1992)	Islanders (1993), n=97	Ladinos (1993), n=44	Foreign Residents (1993), n=5
Municipal Well Piped to House	82	40.2	57	38	20
Private Well Piped to House	n.a.	n.a.	6	2	40
Public Faucet (easy access)	7.5	13.3	8	33	0
Public Seep ("spring")	n.a.	n.a.	0	7	0
Bottled Water	n.a.	n.a.	3	0	20
Combination of Sources	n.a.	n.a.	21	0	20
Without a Water Supply	9.6	46.5	0	0	0
Treatment (chlorine and/or UV/membrane filter)	3	n.a.	11	0	100
Treatment (boiling)	n.a.	n.a.	33	9	20

Source: for Honduras, PAHO (1994); for Bay Islands, analysis of survey data.

that patterns of access to a water supply system for rural and urban areas of Honduras are similar to those in Latin America and the Caribbean as a whole. Approximately 90% of urban and 55% of rural households have access to either a house connection or a public faucet, while 10% of urban and 47% of rural households are without access. The data for the three communities disaggregated by ethnicity and nationality, however, reveal patterns distinct from the aggregate Honduran data. The recent foreign residents of the communities get their water from diverse sources—40% from private wells connected directly to their homes and 20% from municipal water piped to their homes, bottled water, or some combination of these. In addition, virtually all foreign residents treat their water in some way, either with a chlorine, ultraviolet (UV), or membrane filtration system or by boiling. In marked contrast to foreign residents, recent ladino immigrants are most likely to get their water supply from municipal wells piped to their residences (38%) or from a public faucet (33%). Ladinos are also the only group without regular access to a water supply system; 7% of ladino households collect water from two seeps (referred to as “springs” by local residents). Only 9% of ladino households treat their water, all by boiling. The most diverse pattern of access and treatment is found among Islander households: 57% rely on municipal water connected to their homes; 6% have private wells with direct connections; 8% depend on public faucets; 3% on bottled water; and 21% on some combination of sources. A small percentage (11%) treat their water with chlorine and a further 33% by boiling.

Similar differences in patterns of utilization of excreta disposal facilities are revealed in Table 4. The small group of relatively affluent foreign residents has greatest access to a functioning toilet (80%) as well as septic fields/tanks (60%). Ladinos have least access to such facilities (only 16% have functioning toilets and only 14% septic fields/tanks) and are most likely to live in houses with non-functioning toilets/latrines or no disposal facilities at all. The pattern for Islanders is intermediate between foreign residents and ladinos with 50% having a functioning toilet, 35% with a functioning latrine, 15% with a non-functioning toilet/latrine, and 36% with a septic tank/field.

Table 4. Excreta Disposal Facility: Honduras (Urban and Rural) and Communities, Bay Islands (Islanders, Ladino, and Foreign Residents)

Excreta disposal (% of households)	Honduras		Bay Islands		
	Urban (1992)	Rural (1992)	Islanders (1993), n=97	Ladinos (1993), n=44	Foreign Residents (1993), n=5
Functioning Toilet	53	n.a.	50	16	80
Functioning Latrine	38	45	35	32	20
Non-Functioning Toilet or Latrine	n.a.	n.a.	15	34	0
None/Other	9	55	0	18	0
Septic Tank/Septic Field	n.a.	n.a.	36	14	60
Sewerage Connections	39.5	5.7	0	0	0

Source: for Honduras, PAHO (1994); for Bay Islands, analysis of survey data.

Drinking Water Quality. It is simple to summarize the results of the analyses of the 200 samples of drinking water and of brackish and seawater collected from shoreline sites adjacent to human habitation/beaches. All untreated sources of drinking water tested positively for the presence of total coliforms and *E. coli*. Private wells, public wells, "springs", and rainwater cisterns were contaminated. Even the "purified" bottled water which had been shipped to the Islands from the processing plant in San Pedro Sula and distributed through the new franchise on Roatan was contaminated. It is impossible to measure the decline in water quality over time or to correlate deterioration to increases in tourism because no widespread community testing of potable water is known to have been done previously. Anecdotal evidence does exist, however, from interviews with local residents who maintain that they are more frequently ill now with diarrheal diseases than in the past.

Uncontaminated water was found rarely and only when it had undergone some treatment (e.g., chlorine, membrane filters, and/or UV systems). Such systems, especially the use of UV and filtration systems, were found only in the homes of the affluent Island elites and foreign residents and in one high-priced dive resort (owned by the member of the Island elite mentioned earlier who was responsible for the construction of the highly erosive spur road to West Bay Beach). Many of the middle class owners of the moderately-priced hotels are fearful of jeopardizing the health of their guests and are taking steps to try to ensure them a safe water supply through the purchase of "pure" bottled water. While analyses question how "safe" such water really is, even uncontaminated water often becomes contaminated in the process of being served to guests (e.g., through the addition of unpurified ice, by being poured into wet pitchers that have been washed in contaminated water, etc.). Presently, it appears that the only divisions of the Island population that are assured a safe water supply are the relatively affluent foreign residents, the small number of elite families, and the foreign guests in a number of upscale hotels that have their own water purification systems.

Brackish and Seawater Quality. Contamination of seawater also is of growing concern, although most often voiced in terms of its potential effects on divers and the tourism industry rather than on the health of local residents. Table 5 summarizes the results of fecal coliform analyses of seawater from dive sites and along the shoreline of bathing beaches near West Bay Beach, from the urban center of French Harbor, and from the communities of Sandy Bay, West End, and Flowers Bay. The grading system (good, acceptable, and unacceptable) is based on criteria of the World Health Organization for bacterial water quality (WHO/UNEP 1977). These classes are related to respective rates of swimming-associated gastroenteritis and skin symptoms. The density of fecal coliforms near recreational areas of the major urban center of French Harbor increased from about 500 (within the acceptable range) to >1,000 organisms/100 ml (unacceptable) between 1991 and 1993. By 1993, unacceptable levels also occurred near drainage areas in the small community of Flowers Bay.

Table 5. Fecal Coliform Analyses of Seawater Sites—Bay Islands (1991–93)

Site of Sample	Total fecal coliforms (cfu/100 ml)				Grade ^a (1993)
	AOA (1991)	AOA (1992)	AOA (1993)	Study (1993)	
Dive Sites	4–8	2–4	2–4	n.a.	Good
Bathing Beaches (West End/ West Bay)	n.a.	n.a.	n.a.	50–200	Good/ Acceptable
French Harbor (center of harbor)	600	> 1,000	> 1,000	> 1,000	Unacceptable
French Harbor (dock/ recreational boating area near large dive resort)	400	> 1,000	> 1,000	n.a.	Unacceptable
Sandy Bay (shoreline adjacent to dolphin pens, large dive resort)	30–40	8–24	0	50–200	Good/ Acceptable
Sandy Bay (shoreline, community)	n.a.	n.a.	n.a.	200–500	Acceptable
West End (shoreline adjacent to dive resort)	n.a.	n.a.	n.a.	30–50	Good
West End (shoreline, community)	n.a.	n.a.	n.a.	50–300	Good/ Acceptable
Flowers Bay (shoreline, community)	n.a.	n.a.	n.a.	300 to > 1,000	Acceptable/ Unacceptable

^aThis grading system is based on the criterion of the World Health Organization for bacterial beach water quality using the upper median levels of bacteria counts obtained from five consecutive samples: < 100/100 ml = Good; 100 to < 1,000/100 ml = Acceptable; > 1,000/100 ml = Unacceptable (WHO/UNEP 1977). These classes are related to respective swimming-associated gastroenteritis and skin symptom rates of 1–7/1,000 swimmers, 7–16/1,000 swimmers, and > 17/1,000 swimmers (Cheung, Hung, Chang and Kleevens 1991).

Source: AOA (1991, 1992, 1993); analyses of study samples.

Although precise densities are unspecified, unacceptable levels of total coliform and fecal coliform have also been reported for surface water and seawater collected near the other major Roatan urban centers of Coxen Hole and Oak Ridge (BID 1994). While “good” and “acceptable” levels of contamination currently exist at most dive sites, West Bay Beach, and most shoreline locations, unregulated development, escalating populations, and the absence of water supply and waste disposal systems likely will cause higher levels of contamination in the future.

Water Quality and Environmental Health. Current conditions have escalated the incidence of water borne diseases including cholera, dysentery, and hepatitis, as well as facilitated the transmission of water-related diseases such as malaria and dengue fever which thrive in unsanitary conditions (BID 1994). Table 6 compares the relative percentage of outpatient visits by major diagnoses in Honduras and at St. Luke’s Medical Mission located in Sandy Bay. As the only free non-governmental medical clinic on Roatan, St. Luke’s is the primary source of medical care for the poorest segment of the population living in Sandy Bay and in nearby communities. The disproportionate use of the clinic by the poor is indicated by the relatively high number of ladinos who make use of the clinic. While about 48% of the non-tourist population of Sandy Bay classify themselves as ladino, they make up 70% of non-tourist patients to St. Luke’s Mission clinic. As shown in

Table 6. Outpatient Visits by Diagnosis: Honduras (1988) and St. Luke's Mission, Sandy Bay, Bay Islands (1994)

Diagnosis	(% of all cases) St. Luke's Mission, Sandy Bay ^a						
	Honduras	Total	Islanders	Ladinos	Tourists	> 1 year ^b	1-5 years
Acute Respiratory Infections (ARI)	13.9	12.8	15.4	16.0	1.2	43.1	29.0
Diarrhea	16.5	4.7	4.8	4.2	5.4	15.6	6.6
Parasites		7.3	6.8	9.8	2.1	5.5	16.7
Malaria	n.a.	9.7	6.6	13.8	3.5	1.8	8.0
Skin Infections	3.0	4.0	4.8	3.3	4.7	3.7	6.1
Otitis	n.a.	4.7	2.9	3.3	9.5	7.3	3.7
Barotrauma	n.a.	7.5	0.4	0.9	28.8	0.0	0.0

^aAll patient records for 1994 were analyzed. Of the total of 2 509 patient records, 23% were Islanders, 53% were ladinos, and 24% were tourists. In addition, 5% of patients were children < 1 year of age and 18% were children aged 1-5 years.

^bAccording to PAHO (1994), in 1990 the leading causes of death for children under one year of age in Honduras were intestinal infections which accounted for 41% of all deaths and ARIs which accounted for 18% of all deaths.

Source: for Honduras, PAHO (1994); for St. Luke's Mission, analysis of patient records.

Table 6, water-borne, water-washed, and water-related infections and diseases are the major causes of patient visits to the clinic for both Islanders and ladinos of all age groups. Acute respiratory infections, diarrhea, and parasites are the most common causes of clinic visits by both groups. Ladinos and Islanders vary most in the incidence of malaria which account for about 14% of ladino visits but only 7% of Islander visits. This difference likely is due to higher levels of prevalence among ladino immigrants most of whom come from the northern part of Honduras where more than 70% of the total number of malaria cases in the country are diagnosed. Not surprisingly, barotrauma (decompression sickness) and otitis (ear infections) are the major reasons for clinic visits by tourist divers, although tourists have rates of diarrhea and skin infections comparable to those of local people. The degree to which tourists are affected by malaria is unknown as the tourists' average stay on the islands (6.5 days) is usually too short for the disease symptoms to appear.

Environmental and Health Mitigation Efforts

As a means of addressing possible environmental costs stemming from its various economic and fiscal incentives, the GOH passed the General Environmental Law in June 1993 which founded the Ministry of the Environment (Secretaria de Estado en el Despacho de Ambiente, or SEDA) and established the legal process for obtaining an environmental license. Under this legislation, all projects and/or economic activities likely to degrade or contaminate the environment must present an environmental impact study approved by SEDA prior to receiving any concession or project permit from a government agency. Moreover, the execution of any project without first obtaining an environmental license constitutes an environmental crime. In the Bay

Islands, as in the rest of Honduras, SEDA as a ministry level office was given significant power to oversee the environmental feasibility of tourism-related projects. One of SEDA's important roles in the Islands was to execute the \$23.9 million *Bay Islands Environmental Management Project* discussed below.

While maintaining the health of the biophysical environment of the Bay Islands was given some attention by the GOH, the environmental health of local residents has been given relatively low priority by the financially strapped government of Honduras in its efforts to promote tourism. At the insistence of international lenders, the GOH has emphasized two interrelated sets of efforts since the 80s: macro-economic policies aimed at expanding export earnings and stabilizing the balance of payments; and structural adjustment programs targeted at the social, educational, and health sectors (Stonich 1993). Between 1989 and 1992, total public spending declined from \$632 million to \$239 million (in 1988 dollars) and investment in the environment and environmental sanitation fell from \$12.6 million to \$6 million. Despite these reductions, public investment in health increased from \$0.09 million in 1990 to \$1.5 million in 1992. This pattern of spending insinuates a pragmatic decision to attempt to meet immediate health needs rather than to improve long-term health through enhanced preventive measures such as expanding water supply and sanitation systems (PAHO 1994).

In an effort to counter declining budgets for health and social services, social compensatory programs were created in the 90s with funding from international donors, the GOH, and NGOs. One of the most important of these was the Honduran Social Investment Fund (FHIS) of which about 13% of all projects are related to health and nutrition. Among health projects, approximately 29% are for improving drinking water supply and basic sanitation. Although the majority of FHIS projects have focused on large urban centers and poor rural communities on the mainland, a small amount of funding has gone toward improving sanitation on the Bay Islands in collaboration with APRODIB. One cooperative project has involved the construction of composting latrines in a number of Bay Island communities including Flowers Bay. Unfortunately, due to lack of preliminary community training, subsequent follow-up, and evaluation, few of the latrines are being used for their expected purpose. Instead, most are used as shower stalls or storage huts.

In late 1994, after several years of conducting feasibility studies managed by the United Nations Development Program, the IDB approved financing the *Bay Islands Environmental Management Project* with \$19.1 million from the IDB and \$4.8 million from Honduras. The project was fully funded and operational as of April 1996. According to project documents, the IDB is to work through SEDA and Island NGOs, including APRODIB and the BICA. The general objective of the ambitious project is "to maintain and improve the quality of the environment on the Bay Islands as a basis for sustainable economic development" (IDB 1994) and "must benefit the 24,000 people who live on the Islands", according to the project's former executive director. Among the stated objectives are protecting coastal and marine

ecosystems through a method of integrated management; strengthening local capacity for planning, management, and administration; and improving the standard of living of the inhabitants through improvements in water supply and construction of basic sanitation.

To date, however, little if any evidence of project implementation or success is detectable. Despite the participatory rhetoric written into the project summary, interviews with local people in the communities of Sandy Bay, West End, and Flowers Bay during the summer of 1995 revealed that few residents (apart from a small group of wealthier business owners) were well informed about the project or had been consulted in any way. Some residents were badly misinformed believing that the \$23.9 million was to be distributed among Island residents (about \$24,000/person). The decision by the GOH in December 1996 to "restructure" its ministries as part of efforts to cut government expenditures adds to concerns over the ultimate implementation and/or success of the IDB project in the Bay Islands. As part of this restructuring, SEDA was "reorganized" and downgraded from its ministry level. Although it is not clear what the implications of this reorganization will be for the eventual success of the IDB project, a senior staff officer of the Regional Water and Sanitation Network of Central America characterized the project early in 1997 as "dragging its collective heels". Serious reservations have been expressed by staff of a major bilateral development assistance agency who are concerned that the sanitation investments may rely on inappropriate technology and levels of discharge that will be potentially damaging to reefs. In this context, it is difficult to be optimistic about the ultimate success of the IDB project as it now stands.

CONCLUSION

This study reported on the distributional aspects of tourism related to water and environmental health. Results complement earlier project findings that focused on the differential socioeconomic and nutritional effects. Previous results showed that the Bay Islands' poor ladino population was receiving the least benefits from tourism as measured by income, patterns of consumption, and nutrition. Although all Island residents and tourists currently face escalated risks from diseases associated with fresh, brackish, and seawater, it appears that ladino immigrants are confronting even higher risks. Ladinos are significantly more likely than Islanders and foreigners to get their water from springs, the most highly contaminated category of water tested. They are also most likely not to have access to functioning excreta disposal facilities. Currently, ladinos are also least able to protect themselves from water-associated environmental health risks and they are least likely to treat their water in any way. It is not surprising that early in 1994 when the first cases of cholera were reported on the Bay Islands, all cases, according to Gus Salbador (Director of St. Luke's Medical Mission; personal communication in 1995), were among the recent ladino immigrant population. Things have not improved recently. "It can only get worse. Admissions of

poor ladinos to our clinic seem to increase with every month. I've even gotten into the food business as we see more and more malnourished children" (personal communication with Gus Salvador in November 1996).

Understanding the relationships between tourism development, water, and environmental health in the Bay Islands requires understanding the interrelationships among various significant stakeholders, which is also one of the fundamental tasks of political ecological analysis. In this case, the GOH certainly is a major stakeholder, in its historical relationship to the Bay Islands and in terms of the effects of its current fiscal incentives, which encourage foreign exchange leakages and discourage the formation of linkages among other sectors of the economy. Other important stakeholders include international investors, donors, and lenders; national investors and government agencies; desperately poor ladinos on the mainland; non-governmental organizations such as BICA and APRODIB; grassroots organizations such as NABIPLA; an ethnically and economically diverse Bay Island population; and tourists. It is important to note that the Bay Islands case does not present a simple instance of the consequences of excessive foreign investment in the tourism industry. In fact, it was Bay Island elites who precipitated the current tourism boom on the Islands. Moreover, in many instances, the interests of Island elites are more akin to those of foreign investors than to those of their less affluent neighbors.

Many residents, especially those from the predominantly Afro-Caribbean community of Flowers Bay who founded NABIPLA, feel that they have been intentionally excluded from benefiting from tourism development by the GOH, international interests, and Island elites who control the development opportunities. Island elites and middle class business owners engage in environmentally destructive activities while they simultaneously extol the virtues of environmental conservation, attend international tourism conferences, and support the protection of marine reserves at the expense of poor ladinos and Islanders. However, without the support of these poor stakeholders, there is little chance that the existing reserves or the proposed Bay Islands National Marine Park will succeed in their conservation goals.

At present, essentially unregulated tourism development appears to be accelerating through the construction of upscale hotels and resorts by Island elites, Honduran elites from the mainland, and well-capitalized foreign investors; the expansion of small-scale hotels, rooms for rent, and other tourism-related businesses by middle-class Islanders and less-well capitalized foreigners; and the increased parcelization of remaining areas of tropical forests, upland areas, and prime beach property which is being sold principally to foreigners from the United States. The influx of a large number of less-healthy ladinos along with unbridled development and increased pressures on resources from tourists, within a framework of diminished national and international capacity, affects the environmental quality of the Islands, the environmental health of the population, and the long-term viability of the tourism industry itself. The inability of the GOH, the IDB, and the major NGOs (BICA and APRODIB) to stem the

negative environmental effects and associated human costs of tourism mandate the meaningful involvement of local people in all facets of the industry, not just as workers at the lowest level of employment. This is the most important policy lesson to be gleaned from this case study. The emergence and expansion of NABIPLA beyond Flowers Bay to other parts of Roatan and the insistence of the residents of West End to have community control of their marine reserve demonstrate that the less empowered on the Islands want to share in the benefits of development and are likewise committed to sustaining the environment and natural resources on which an alternative tourism can be based.

The problems associated with unbridled tourism development in the Bay Islands are similar to those that have occurred elsewhere on small islands undergoing explosive growth in tourism. That is, the question is how best to ensure economic development that is both socially equitable and environmentally sound, within a context of limited resources and mounting population pressures. Tropical islands frequently suffer from an imbalance between the supply and demand of resources required to sustain life and livelihoods. The Bay Islands example indicates that a systemic, integrative policy approach is needed to ensure equitable and environmentally conservative development. Such policy should ensure collaboration among all relevant stakeholders as well as specify vital roles for each. For the GOH this must include some measures (e.g., legislation, regulations, and fiscal disincentives) to balance the effects of the fiscal incentives and strengthened efforts to enforce the laws and regulations that already exist. Tourism businesses also must become involved, not only in mitigating their own impacts but also in making their guests aware of the environmental and social implications of their visits. Tourists too must play their part and be willing to curtail temporarily their usual standards of comfort.

While such recommendations could be made for many small islands, the Bay Islands are different from most small island economies in one momentous way: they are not politically independent but rather are part of a larger nation-state from which they have been largely culturally, socially, and economically distinct. The long-standing animosity and sometimes violent conflict between the Anglo-Caribbean/Afro-Caribbean Islanders and the nation of Honduras adds a formidable obstacle to achieving just, environmentally sound, and viable development for the Islands. □ □

Acknowledgments—This research was made possible by grants from the University of California Research Expedition Program, Earthwatch, and the University of California Academic Senate. Special thanks are due to: George Haseman and Gloria Lara of the Honduran Institute of Anthropology and History; Becky Myton of the National Autonomous University of Honduras and the Honduran Ministry of the Environment; Gus Salvador, Director of the Cornerstone Mission on Roatan; Jackie Woods, Director of the Roatan Hospital; and Cheryl Galindo and staff of the Bay Islands Conservation Association for their support. The author would also like to thank the hundreds of Bay Islanders who participated in the study, the many US and Honduran student and project volunteers, students in her seminar on tourism, and Matthea Cremers for their efforts in collecting and analyzing the data.

REFERENCES

AOA

- 1991 Bacterial Contamination in Waters in and Around Roatan, Islas de la Bahia, Honduras, Central America. New Orleans: Aquarium of the Americas.
 1992 Bacterial Contamination in Waters in and Around Roatan, Islas de la Bahia, Honduras, Central America. New Orleans: Aquarium of the Americas.
 1993 Bacterial Contamination in Waters in and Around Roatan, Islas de la Bahia, Honduras, Central America. New Orleans: Aquarium of the Americas.

Archer, E.

- 1985 Emerging Environmental problems in a Tourist Zone: The Case of Barbados. *Caribbean Geography* 2:46–55.

BID

- 1994 Programa de Manejo Ambiental de las Islas de la Bahia. Version of 21 September. Washington DC: Banco Interamericano de desarrollo.

Blaikie, P.

- 1985 *The Political Economy of Soil Erosion in Developing Countries*. London: Longman.

Blaikie, P., and H. Brookfield

- 1987 *Land Degradation and Society*. London: Methuen.

Britton, S.

- 1982 The Political Economy of Tourism in the Third World. *Annals of Tourism Research* 9:331–358.
 1987 Tourism in Small Developing Countries. In *Ambiguous Alternative: Tourism in Small Developing Countries*, S. Britton and W. C. Clarke, eds., pp. 167–194. Suva: University of the South Pacific.
 1989 Tourism, Dependency and Development: A Mode of Analysis. In *Towards Appropriate Tourism: The Case of Developing Countries*, T. V. Singh, H. L. Theuns and F. M. Go, eds., pp. 93–116. Paris: Peter Lang.

Brohman, J.

- 1996 New Directions in Tourism for Third World Development. *Annals of Tourism Research* 23(1):48–70.

Bryant, R. L.

- 1992 Political Ecology: An Emerging Research Agenda in Third World Studies. *Political Geography* 11(2):12–36.

CAN

- 1996 Central American Presidents to Talk Tourism. Central American News. <http://magi.com/calypso/news/ca54.html> (May 3).

Checchi, V.

- 1959 Honduras: A Problem in Economic Development. New York: The Twentieth Century Fund.

Cheung, W. H. S., R. P. S. Hung, K. C. K. Chang, and J. W. L. Kleevens

- 1991 Epidemiological Study of Beach Water Pollution and Health-Related Bathing Water Standards in Hong Kong. *Water, Science and Technology* 23:243–252.

Cohen, E.

- 1978 The Impact of Tourism on the Physical Environment. *Annals of Tourism Research* 5:215–237.

Conroy, M. E., D. L. Murray and P. E. Rosset

- 1996 *A Cautionary Tale: Failed U.S. Development Policy in Central America*. Boulder CO: Lynne Rienner.

Davidson, W. V.

- 1974 *Historical Geography of the Bay Islands, Honduras*. Birmingham: Southern University Press.

Dieke, P. U. C.

- 1993 Tourism in The Gambia: Some Issues in Development Policy. *World Development* 21(2):277–289.

Edwards, F., ed.

- 1988 *Environmentally Sound Tourism in the Caribbean*. Alberta: The University of Calgary Press.

Enloe, C.

- 1989 On the Beach: Sexism and Tourism. In *Making Feminist Sense of International Politics*. Berkeley: University of California Press.

- Faber, D.
1992 *Environment Under Fire*. New York: Monthly Review Press.
- FIDE (Foundation for Investment and Development of Exports)
1997 Investing in Honduras. <http://www.hondurasinfo.hn/invest.html> (February 4).
- Gajraj, A. M.
1981 Threats to the Terrestrial Resources of the Caribbean. *Ambio* 10(6):307–311.
- Green, H., and C. Hunter
1992 The Environmental Impact Assessment of Tourism Development. In *Perspectives on Tourism Policy*, P. Johnson and B. Thomas, eds. London: Mansell.
- Grenon, M., and M. Batisse, eds.
1989 *Futures for the Mediterranean Basin: The Blue Plan*, pp. 156–157. London: Oxford University Press.
- Guha, R.
1990 *Unquiet Woods*. Berkeley: University of California Press.
- HACH
1993 HACH Analytical Procedures: Coliform Procedures. Loveland CO: HACH Corporation.
- Harrison, D.
1992 *Tourism and the Less Developed Countries*. London: Belhaven.
- Hunter, C., and H. Green
1995 *Tourism and the Environment: A Sustainable Relationship?* London: Routledge.
- IDB
1994 *Bay Islands Environmental Management Project: Project Summary*. Washington DC: Inter-American Development Bank.
- IRF
1996 *Tourism and Coastal Degradation: Costs and Benefits of Caribbean Coastal Tourism*. St. Thomas: Island Resources Foundation.
- de Kadt, E.
1992 Making the Alternative Sustainable: Lessons from Development for Tourism. In *Tourism Alternatives*, V. L. Smith and W. R. Eadington, eds., pp. 47–75. Philadelphia: University of Pennsylvania Press.
- Kocasoy, G.
1989 The Relationship between Coastal Tourism, Sea Pollution and Public Health: A Case Study from Turkey. *The Environmentalist* 9(4):245–251.
1995 Effects of Tourist Population Pressure on Pollution of Coastal Seas. *Environmental Management* 19:75–79.
- LADB
1996 Central American Presidents Draw up Joint Plan to Develop Regional Tourism Industry. *Ecocentral: Latin America Data Base* 1(3).
- Lanfant, M.-F., and N. H. H. Graburn
1992 International Tourism Reconsidered: The Principal of the Alternative. In *Tourism Alternatives: Potentials and Problems in the Development of Tourism*, V. L. Smith and W. R. Eadington, eds., pp. 88–112. Philadelphia: University of Pennsylvania Press.
- La Prensa
1997 Firman convenio para construir hotel de la cadena Holiday Inn. *La Prensa*. 24 de enero de 1997. Online edition. <http://www.laprensa.hn.com/econoarc/9701/e24003.html>.
- Lindberg, K.
1991 Policies for Maximizing Nature Tourism's Ecological and Economic Benefits. Washington DC: World Resources Institute.
- Little, P., and M. Horowitz, eds.
1987 *Lands at Risk in the Third World*. Boulder CO: Westview Press.
- Lovich, M., and G. White
1990 Use and Transformation of Terrestrial Water Systems. In *The Earth as Transformed by Human Action: Global and Regional Changes in the Biosphere over the Past 300 Years*, B. L. Turner et al, eds., pp. 235–250. Cambridge: Cambridge University Press.
- Mathieson, A., and G. Wall
1982 *Tourism: Economic, Physical and Social Impacts*. New York: Wiley.

- Mieczkowski, Z.
1995 *Environmental Issues of Tourism and Recreation*. London: University Press of America.
- Miller, M. L., and J. Auyong
1991 *Coastal Zone Tourism: A Potent Force Affecting Environment and Society*. *Marine Policy* 15(2):75–99.
- Murray, D. L.
1994 *Cultivating Crisis: Pesticides and Development in Latin America*. Austin: University of Texas Press.
- NABIPLA (Native Bay Islanders Professionals and Laborers Association)
1995 NABIPLA's Newsletter: *Bay Islanders Echo* 1(1):3.
- Nelson, J. G., R. Butler and G. Wall, eds.
1993 *Tourism and Sustainable Development: Monitoring, Planning, Managing* (Vol. 37). Waterloo: University of Waterloo.
- Oglethorpe, M.
1982 Recent Developments in Maltese Water Supply. *Geography* 67:62–64.
- Oliver-Smith, A.
1989 Tourist Development and the Struggle for Local Resource Control. *Human Organization* 48(4):345–350.
- Painter, M., and W. Durham, eds.
1995 *The Social Causes of Environmental Destruction in Latin America*. Ann Arbor: University of Michigan Press.
- PAHO (Pan-American Health Organization)
1994 Honduras. *In Health Conditions in the Americas* (Vol. 2), pp. 252–265. Washington DC: PAHO.
- Parsons, J.J.
1954 English Speaking Settlement of the Western Caribbean. *Yearbook of the Association of Pacific Coast Geographers* 16:3–16.
- Patullo, P.
1996 *Last Resorts: The Cost of Tourism in the Caribbean*. London: Cassell.
- Pearce, D.
1989 *Tourist Development*. Harlow: Longman.
- Peet, R., and M. Watts
1993 Introduction: Development Theory and Environment in an Age of Market Triumphalism. *Economic Geography* 69:227–253.
- Peluso, N.
1993 *Rich Forests, Poor People*. Berkeley: University of California Press.
- Pigram, J. J.
1980 Environmental Implications of Tourism Development. *Annals of Tourism Research* 7:554–583.
- Pleumarom, A.
1994 The Political Economy of Tourism. *The Ecologist* 24(4):142–148.
- Poirier, R. A., and S. Wright
1993 The Political Economy of Tourism in Tunisia. *Journal of Modern African Studies* 31(1):149–162.
- Ritchie, L. H. et al
1965 *A Regional Study of Tourism Development in Central America: A Study Prepared for Central American Bank for Economic Integration*. Tegucigalpa: CABEL.
- SECEPLAN
1989 *Censo Nacional de Poblacion y Vivienda*. Tegucigalpa: Secretaria de Planificacion, Coordinacion y Presupuesto.
- Smith, V. L., and W. R. Eadington, eds.
1992 *Tourism Alternatives: Potentials and Problems in the Development of Tourism*. Philadelphia: University of Pennsylvania Press.
- Sorensen, J. C.
1993 *A Plan to Establish, Develop and Manage the Bay Island National Marine Park*. Gainesville FL: Tropical Research and Development, Inc.
- Stonich, S. C.
1989 The Dynamics of Social Processes and Environmental Destruction: A Central American Case Study. *Population and Development Review* 15(2):269–296.
1993 "I Am Destroying the Land!" The Political Ecology of Poverty and Environmental Destruction in Honduras. Boulder CO: Westview Press.

- Stonich, S. C., and J. H. Sorensen
1995 The Political Ecology of Tourism Development in the Bay Islands, Honduras: Aspects of Nutritional Status. Paper presented at the *Tourism, Environment and Health Symposium*—annual meeting of the Society for Applied Anthropology, Albuquerque NM.
- Stonich, S. C., J. H. Sorensen, and A. Hundt
1995 Ethnicity, Class, and Gender in Tourism Development: The Case of the Bay Islands, Honduras. *Journal of Sustainable Tourism* 3(1):1–28.
- Tsartas, P.
1992 Socioeconomic Impacts of Tourism on Two Greek Isles. *Annals of Tourism Research* 19:516–533.
- UNEP (United Nations Environment Program)
1984 Tourism and the Environment. *Journal of Industry and the Environment* 7(1):1–3.
1995 Environmental Codes of Conduct for Tourism (Vol. 29). Paris: United Nations Publications.
- Vega, A., W. Alevizon, R. Dodd, R. Botafios, E. Villeda, C. Cerrato and V. Castro
1993 Watersheds, Wildlands, and Wildlife of the Bay Islands, Honduras: A Conservation Strategy (2 Vols). Gainesville FL: Tropical Research and Development, Inc.
- WHO
1993 Guidelines for Drinking-Water Quality (Vol. 1). Geneva: World Health Organization.
- WHO/UNEP (World Health Organization/United Nations Environment Program)
1977 Health Criteria and Epidemiological Studies Related to Coastal Water Pollution. Copenhagen: WHO Regional Office for Europe.
- Wilkinson, P.
1989 Strategies for Tourism in Island Microstates. *Annals of Tourism Research* 16:153–177.
- Williams, R.
1986 Export Agriculture and the Crisis in Central America. Chapel Hill: University of North Carolina Press.
- Wolf, E.
1972 Ownership and Political Ecology. *Anthropological Quarterly* 45(3):201–205.
- Wong, P. P. ed.
1993 Tourism vs. Environment: The Case of the Coastal Areas (Vol. 26). Dordrecht: Kluwer.
- World Bank
1993 World Development Report 1993: Investing in Health. New York: Oxford University Press.
- WTO
1993 Yearbook of Tourism Statistics (Vol. 1). Madrid: World Tourism Organization.

Submitted 6 October 1996

Resubmitted 15 February 1997

Accepted 28 February 1997

Refereed anonymously

Coordinating Editor: Robert A. Poirier